

## INDEX TO VOLUME 36

[Last year this Journal instituted a computer-generated annual index in order to provide increased flexibility and accuracy over that attained by previously used techniques. This year's index was again computer generated but utilizes more sophisticated data entry and handling procedures as well as a more readable print out. A General Electric 635 computer operated in the time-share mode and programmed for BASIC language was used to drive a Friden 7100 Conversational Terminal teleprinter. Raw index data was entered into storage from the Friden terminal in the Journal editorial office. The computer program produced all aspects of the author and subject indexes including not only all cross referencing in both author and subject categories but also the final format for photo-offset printing. Several pertinent characteristic times of some interest are: program development - 250 man-hours; data entry, 16 hours per year; proofreading and correcting, 4 hours per year; total computer usage time, 20 minutes; final output to teleprinter, 4 hours. A more complete report of the technical aspects of this indexing program is being prepared for publication.]

Various people and organizations have contributed to this index. The 250 man-hours of program development alluded to above was provided by Arthur Luehrmann. Without his encyclopedic knowledge of computer workings this index would not exist. Most impressive was the indefatigable good humor with which Mary Russell cajoled the completed index out of both people and machines. The teleprinter and excellent servicing were contributed to the Journal by the Friden Corporation. Particular thanks are extended to them and to the personnel of the Kiewit Computation Center at Dartmouth College for their valuable assistance.--Ed.]

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## ANALYTIC SUBJECT INDEX TO VOLUME 36

The American Journal of Physics Subject Index is different and, we think, better than many other subject matter indexes. Since its method of organization may be new to many of our readers, some instruction in its proper use is in order.

The vast majority of American Journal of Physics articles fall under more than one of the subject categories we use (see list below). Thus a paper describing a mechanics experiment will fall under the headings 310 and 110, and possibly others. In the American Journal of Physics index such an article will appear under each principal category to which it pertains. Furthermore, and this is the novel feature of our index, articles with the same second category are grouped together within the principal category.

For example, under the heading "310 - Experiments" all articles which are also classified under "110 - Classical Mechanics" are grouped together in a block carrying the prefix "110:". Similarly under the principal heading "110 - Classical Mechanics" all articles also classified as experiments are grouped together and carry the prefix "310:". A prefix "000:" means that there is no secondary classification for that block of articles.

Under each principal subject heading book reviews, film reviews, and abstracts of papers read at meetings are segregated from one another and from the remainder of the published papers. The latter appear under a subheading "Regular Articles, Notes and Letters." Notes and letters are distinguished from regular articles by an "N" or "L" appended to the page number. The number preceding the page number is the issue number.

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- 145 - Electricity and Magnetism
- 150 - Geometrical Optics
- 151 - Wave and Quantum Optics
- 154 - X Rays
- 155 - Quantum Mechanics
- 160 - Nuclear Physics
- 163 - High-Energy Physics
- 166 - Elementary Particles
- 170 - Atomic Physics
- 173 - Molecular Physics
- 176 - Plasma Physics
- 180 - Fluids--Liquids and Gases
- 185 - Solid-State Physics
- 190 - Astronomy and Astrophysics
- 195 - Cosmic Rays

## 200 - Other Related Fields

- 210 - Mathematics and Mathematical Physics
- 220 - Electronics
- 230 - Engineering
- 240 - Chemical Physics
- 250 - Geophysics
- 260 - Space Physics
- 270 - Biophysics
- 280 - History and Biography
- 290 - Philosophy of Science

## 300 - Aids to Physics Teaching--Hardware

- 310 - Experiments
- 320 - Demonstration Apparatus
- 330 - Laboratory Apparatus
- 340 - Laboratory Arts and Techniques
- 350 - Laboratory Organization and Operation
- 355 - Buildings and Architecture
- 360 - Computers and Data-Processing

## 400 - Aids to Physics Teaching--Software

- 410 - Books
- 420 - Course Design
- 430 - Resource Letters
- 440 - Journals
- 450 - Audio and Visual Aids
- 455 - Films
- 460 - Instructional Computer Use
- 470 - Testing--Theory and Techniques

## 500 - Science Education

- 510 - Curriculum
- 520 - Elementary and Secondary School Science
- 530 - Teacher Training
- 540 - Teaching Methods and Strategies

## 600 - Science and Society

## 700 - Physics Organizational Activities

- 710 - American Association of Physics Teachers
- 720 - Commission on College Physics
- 730 - American Institute of Physics
- 740 - Conferences and Institutes
- 750 - Reports, Announcements and News

## 800 - American Journal of Physics

- Systems of Units--Weibel E S--12/1130
- 145:Definition of the Units, Ampere and Volt--Weinstock R--3/277/L
- 170:Biography of the X Unit - The X-Ray Wavelength Scale--Thomsen J S, Burr A F--9/803

## 100 - FIELDS OF PHYSICS

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- 410:R Stevenson and R B Moore, 'Theory of Physics'--Anderson D L--11/1025

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- 000:Dimensionally Correct Transformations between Different

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- 000:Catching a Baseball--Chapman S--10/868
- =>Time-Translation Invariance for Certain Dissipative

- Classical Systems--Denman H H--6/516  
 ->Spherical Pendulum and Motion in a Dipole Field--Fox K--11/1018/N  
 ->Pumping on a Swing--Tea P L, Falk H--12/1165/N  
 130:Momentum of Longitudinal Elastic Vibrations--Gilbert I H, Mollow B R--9/822  
 145:Magnetic Interactions between Charged Particles--Breitenberger E--6/505  
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 160:Comment on 'Central Force Motion without Calculus'--Cronin J L, Jones L C--8/758/N  
 170:Macroscopic Embodiment of the Maser Principle--Dehmelt H G--10/910/N  
 180:Comment on: Shadow-Sausage Effect--Smith M J--10/912/N  
 185:Motion of an Elastic Ball on a Regularly Corrugated Surface--Ertage P R--12/1126  
 ->Isotopic Mass Dependence of Sound Velocities--Nordtvedt K--2/162/N  
 210:Classical Transformation Operators and the S Matrix--Campbell P M--11/931  
 ->Algebraic Equivalence of the Lagrangian and of the Hamiltonian Forms of the Equations of Motion--Levitas A D--12/1144  
 ->Canonical Transformations without Hamilton's Principle--Ludford G S S, Yarnitell D W--3/231  
 ->Group Theory and Normal Modes--Nussbaum A--6/529  
 ->Angular Velocity of an Orthogonal Curvilinear Coordinate Frame--Bleick W E--7/638/N  
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 ->Velocity Hodograph of Inverse-Square Central Force Motion--Cronin J L, Jones L C--11/1016/N  
 ->Lagrange's Equations from Intrinsic Geometry of Coordinate Systems--Kelly E M--10/908/N  
 ->Comments on Generalized Mechanics--Kruger J G, Callebaut D K--6/557/N  
 290:On Mach's Nonconcept of Mass - A Reply to M Mueller--Bunge M--2/167/L  
 ->In Defense of Mach--Mueller M M--2/166/L  
 310:The Surf Skimmer--Edge R D--7/630  
 ->Demonstration Experiment Using a Dissectable Anharmonic Oscillator--Fox J N, Arlotto J J--4/326  
 ->Some Pitfalls in Demonstrating Conservation of Momentum--Armstrong H L--1/56/N  
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 ->Impulse Experiment for a Linear Air Track--Fox J N, Broker S F, Fischer W K--7/637/N  
 ->Novel Method of Measuring Inertial Moment--Schruben D L--5/460/N  
 320:Matrices and Superballs--Strobel G L--9/834  
 ->Double Floating Puck--Daw H A--11/1022/N  
 ->Air Bearing Support for a Pendulum--Jensen H C, Monahan J R--5/459/N  
 ->Superball Bounce Projectiles--Mellen W R--9/845/N  
 ->Improved Projectile Demonstration--Osgood T H--4/367/L  
 330:High-Pressure Viscosity Experiment for the Undergraduate Laboratory--Stajdohar R E, Towle L C--4/340  
 ->Using a Blowgun with the Ballistic Pendulum--Bayliss L T, Pfolliott C F--6/558/N  
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 ->A Center Bearing for the Air Table--Daw H A--11/1020/N  
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 130:A Demonstration of Standing Longitudinal Waves--Mamola K C--12/1185  
 180:A Fluid-in-a-Reservoir Picture of Stored Energy--Seren L--12/1183  
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 210:K Karamcheti, 'Vector Analysis and Cartesian Tensors with Selected Applications'--Kaplan J I--6/567  
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 ->Nonlinear Gravity: A Discussion for Freshmen--Groom D E--7/632  
 ->Counterexample to the Lenz-Schiff Argument--Rindler W--6/540  
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 130:Another Note on the Twin Paradox--Eisenlohr H--7/635/N  
 145:On the Trouton-Noble Experiment--Butler J W--11/936  
 ->Radiation and the Classical Electron--Newburgh R G--5/399  
 ->Elementary Explanation of Lorentz-Fitzgerald Contraction--Parker E M--2/156  
 ->Is Charge Conservation Needed to Derive the Displacement Current?--Yano A F--7/599  
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 170:Note on Elastic Scattering--Olson J--4/366/N  
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 400:Graphical Method of Illustrating Relativistic Conservation Laws--Hegarty J C--3/270  
 430:Resource Letter GR-1 on General Relativity--Brill D R, Perisho R C--2/85  
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- 135: Forces, Uncertainty and the Gibbs Entropy--Baierlein R--7/625  
 ->Integral-Differential Equation for the Temperature-Dependent Spatial Distribution Function--Kostin M D--4/330  
 ->Adiabatic Transitions and the Microscopic Interpretation of Entropy--Pearlman N--2/163/N  
 140: Thermodynamic and Statistical Aspects of Magnetic Cooling--Weinstock H--1/36  
 145: Green Function Theory of the Two-Spin System--Lucas G L--11/942  
 155: Approach to Radiative Equilibrium of Free Electrons through Cerenkov Emission and Absorption--Arunasalam V--7/601  
 ->Nature of Quantum States--Park J L--3/211  
 180: Bernoulli Effect and Kinetic Theory--Glover F--9/811  
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 185: Influence of Band Structure on the Thermal Properties of Metals--Glasser M L, Lucas A A--5/445  
 ->Green's Function Theory of Ferromagnetism--Patterson J D, Southwell W H--4/343  
 210: Difference-Equation Solutions for the Linear Ising Model and Nearest-Neighbor Fluid--Leff H S, Flicker M--7/591  
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 240: The One-Dimensional KDP Model in Statistical Mechanics--Nagle J F--12/1114  
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 210: Alternative Exact Solution of the One-Dimensional Ising Model--Leff H S, Flicker M--12/1183  
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 540: The Pedagogy of Statistical Mechanics--Hobson A--12/1183  
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 176: A G Sitenko, 'Electromagnetic Fluctuations in Plasma'--Hirshfield J L--7/644  
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- REGULAR ARTICLES, NOTES AND LETTERS - - - - -  
 130: 'N Waves' from Bursting Balloons--Deihl D T, Carlson F R--5/841  
 ->Boundary Conditions for Spherical Sound-Wave Propagation--Johnson J N--4/334  
 185: Bloch-Type Equations for Acoustic Nuclear-Magnetic Resonance--Breitbart M D S, Barker W A--2/151  
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 000: Instruments to be Used to Demonstrate Boundary Conditions for a Course in Musical Acoustics--Lynch M A--12/1185  
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 130: Films on Acoustics and Wave Motion--Stumpf F B--11/1026  
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- REGULAR ARTICLES, NOTES AND LETTERS - - - - -  
 110: Momentum of Longitudinal Elastic Vibrations--Gilbert I H, Hollow B R--9/822  
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 140: Second-Sound Experiment for Advanced Laboratories--Merrill J R--2/137  
 145: Obliquity Factors of Huygens and Kirchhoff Theories Applied to Experimental Diffraction by Two Long, Coplanar, Parallel Strips--DeAcetis L A, Lazar I--9/830  
 150: Rays from a Parabolic Reflector for an Off-Focal-Point Source--Lazar I, DeAcetis L A--2/139  
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- 155: Erratum: Density of States in a Sphere and Cylinder (36,417,1968)--Lambert R H--12/1169  
 ->Density of States in a Sphere and Cylinder--Lambert R H--5/417  
 176: A Sequel to: 'Wave Propagation in Inhomogeneous Gyrotropic Warm Plasmas' by H Unz--Burman R--7/635/N  
 310: A Laboratory Approach to an Eigenvalue Problem--Clendenning L M--10/879  
 ->Raman Spectroscopy Experiment for the Senior Laboratory--Fugitt B R, Rupaal A S--1/17  
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- REGULAR ARTICLES, NOTES AND LETTERS - - - - -  
 000: Intersecting Adiabatic Surfaces and the Second Law of Thermodynamics--Curry S M, Henry G R--9/838  
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 350:Laboratory Arrangement in a New Perspective--McCord W M--10/874  
 420:An Experiment-Oriented General Physics Course--Snyder D D--11/1005  
 BOOK REVIEWS  
 185:G P Poole, 'Electron Spin Resonance'--Rogers R W--8/765  
 330:E V Angerer and H Ebert, 'Physical Laboratory Handbook'--Armstrong H L--1/66

## 350 - LABORATORY ORGANIZATION AND OPERATION

- REGULAR ARTICLES, NOTES and LETTERS  
 000:From Hertz to Gigahertz: An Undergraduate Physics-Electronics Laboratory Course--Drumheller J E--6/550  
 330:A Simple Apparatus for Moseley's Law--Hohenemser C, Asher I M--10/882  
 340:Laboratory Arrangement in a New Perspective--McCord W M--10/874  
 420:A Sophomore Course in Experimental Physics--Carver G P, Scarl D B--4/361  
 ->A Laboratory Course for Nonscience Majors--Fryshman B--3/262  
 540:A New Approach to Teaching of Elementary Physics--Bertman B, Chase W, Creeger E S, Fox J N, Krogh C--12/1134  
 720:The Divergent Laboratory--Ivany J W G, Farlett M R--11/1072  
 ABSTRACTS ONLY  
 000:A Special Laboratory Program for an Introductory Physics Course--Saunders E A, Radford L E, Elton R M, Baur J F--1/78  
 420:The Role of the Laboratory in Education--Zelby L W--12/1187

## 355 - BUILDINGS AND ARCHITECTURE

- REGULAR ARTICLES, NOTES and LETTERS  
 320:A New Design for Lecture Auditoria--Walz F C, Bartlett A A--11/964

## 360 - COMPUTERS AND DATA-PROCESSING

- REGULAR ARTICLES, NOTES and LETTERS  
 150:Rays from a Parabolic Reflector for an Off Focal-Point Source--Lazar I, Deacetis L A--2/139  
 ->Letter re: 'Rays from a Parabolic Reflector for an Off Focal-Point Source'--Harris R B--11/1022/L  
 310:Quantitative Field Mapping Experiments--Grossberg A B--8/698  
 ABSTRACTS ONLY  
 460:Experimental Computer-Oriented Introductory Laboratory--Smith P A--12/1180  
 BOOK REVIEWS  
 163:R P Shutt, Ed, 'Bubble and Spark Chambers, Vol II'--Roberts A--4/371

## 400 - AIDS TO PHYSICS TEACHING--SOFTWARE

- REGULAR ARTICLES, NOTES and LETTERS  
 115:Graphical Method of Illustrating Relativistic Conservation Laws--Hegarty J C--3/270  
 130:Introduction to X-Ray Diffraction Through Analogies in Interference Patterns--Muldawer I--1/57/N  
 BOOK REVIEWS  
 151:M Francon, 'Optical Interferometry'--Stone J M--1/64

## 410 - BOOKS

- BOOK REVIEWS  
 000:R R Rathbone, 'Communicating Technical Information'--Hendee J R--11/1025  
 ->S O G MacDonald, 'Problems and Solutions in General Physics for Science and Engineering Students'--Larson L E--6/566  
 ->G P Harnwell and G J F Legge, 'Physics: Matter, Energy and the Universe'--Lazarus D--3/281  
 ->F W Constant, 'Fundamental Principles of Physics'--Priestley H--6/561  
 ->F A Kaemper, 'The Elements of Physics'--Stehle P--3/282  
 ->L H Greenberg, 'Discovery in Physics'--Stetson R F--11/1024  
 100:R Stevenson and R B Moore, 'Theory of Physics'--Anderson D L--11/1025  
 110:J W Leach, 'Classical Mechanics'--Carlson B C--1/67  
 ->L D Landau, A I Aikhezer and E M Lifshitz, 'General



- Physics: Mechanics and Molecular Physics--Constant F W--  
9/854  
->T C Bradbury, 'Theoretical Mechanics'--Laslett L J--  
9/856  
->G Triffitt, 'Mechanics: Points Objects and Particles'--  
Rense W A--9/858  
->R Abraham, 'Foundations of Mechanics'--Young H D--3/280  
120:D Pines and P Nozieres, 'The Theory of Quantum  
Liquids'--Corngold N--3/279  
->A A Abriksov, I P Gor'kov and I Y Dzyaloshinskii,  
'Quantum Field Theoretical Methods in Statistical  
Physics'--Corngold N--3/280  
->M J Beran, 'Statistical Continuum Theories'--Pytte A--  
10/923  
->T A Bak, Ed, 'Statistical Mechanics: Foundations and  
Applications'--Radin S H--6/561  
125:I Lehiate, Ed, 'Readings in Acoustic Phonetics'--Josephs  
J J--2/172  
->F Winckel, 'Music, Sound and Sensation, A Modern  
Exposition'--Josephs J J--4/375  
130:D H Towne, 'Wave Phenomena'--Good R H--2/169  
135:D ter Haar and H Wergeland, 'Elements of  
Thermodynamics'--Romer R H--2/171  
140:J Wilks, 'The Properties of Liquid and Solid Helium'--  
Fairbank H A--8/764  
145:M McCall, 'Attraction and Repulsion'--Armstrong H L--  
9/859  
->D W Parkinson and B E Mulhall, 'The Generation of High  
Magnetic Fields'--Furth H P--6/565  
->P Penfield and H A Haus, 'Electrodynamics of Moving  
Media'--Farker E N--5/468  
150:A K Levine, 'Lasers, Vol. I'--Lutton D--2/169  
->L Allen and D G C Jones, 'Principles of Gas Lasers'--  
King A L--7/643  
->N J Harrick, 'Internal Reflection Spectroscopy'--  
Kirkpatrick P--10/924  
->G R Fowles, 'Introduction to Modern Optics'--Lynch D W--  
8/770  
151:J B DeVelis and G O Reynolds, 'Theory and Applications  
of Holography'--Cox M E--4/369  
->J B DeVelis and G O Reynolds, 'Theory and Applications  
of Holography'--Lynch D W--4/370  
->D J E Ingram, 'Spectroscopy at Radio and Microwave  
Frequencies'--Found R V--8/768  
->M Francon, 'Optical Interferometry'--Stone J M--1/64  
->G J Troup, 'Optical Coherence Theory - Recent  
Developments'--Stone J M--8/764  
155:J J Sakurai, 'Advanced Quantum Mechanics'--Freedman D  
Z--5/465  
->F Calogero, Ed, 'Variable-Phase Approach to Potential  
Scattering'--Green T A--6/566  
->S Borowitz, 'Fundamentals of Quantum Mechanics'--Kane G  
L--8/769  
->M J Klein, Transl, 'Letters on Wave Mechanics: Albert  
Einstein, Erwin Schroedinger, Max Planck, H A Lorentz--  
Michels C C--8/766  
->A Yaviv, 'Quantum Electronics'--Moos H W--2/168  
->J M Jauch, 'Foundations of Quantum Mechanics'--Morrow R  
A--8/771  
->A B Migdal, 'Theory of Finite Fermi Systems and  
Applications to Atomic Nuclei'--Moszkowski S A--9/855  
->A A Sokolov, Y M Loskutov and I M Ternov, 'Quantum  
Mechanics'--Park D--2/173  
->B L van der Waerden, 'Sources of Quantum Mechanics'--  
Park D--4/374  
->B R Judd, 'Second Quantization and Atomic  
Spectroscopy'--Slater J C--1/69  
160:G E Brown, 'Unified Theory of Nuclear Models and  
Forces'--Green A E S--4/371  
->B L Cohen, 'The Heart of the Atom, the Structure of the  
Atomic Nucleus'--Quinton A R--12/1174  
->W E Meyerhof, 'Elements of Nuclear Physics'--Quinton A  
R--8/766  
->R R Roy and B P Nigam, 'Nuclear Physics'--Titus F--8/767  
163:R J Eden, 'High Energy Collisions of Elementary  
Particles'--Kallen G--6/565  
->R P Shutt, Ed, 'Bubble and Spark Chambers, Vol II'--  
Roberts A--4/371  
166:University of Miami Lectures, 'Symmetry Principles and  
Fundamental Particles'--Ball N F--5/468  
->H Pilkuhn, 'The Interaction of Hadrons'--McKellar B H  
J--9/855  
->W R Frazer, 'Elementary Particles'--Thorndike A M--1/70  
->E H S Burhop, Ed, 'High Energy Physics, Vol II'--  
Thorndike A M--7/646  
170:V Y Velde, R Y Damburg and R K Peterkop, Eds, 'Atomic  
Collisions: The Theory of Electron-Atom Collisions'--  
Gerjuoy E--2/173  
->W R Hindmarsh, 'Atomic Spectra'--Grim H R--3/279  
->S C Brown, Ed, 'Electrons, Ions, and Waves: Selected  
Works of William Phelps Allis'--Loeb L L--3/283  
->S Fraga and G Malli, 'Many-Electron Systems: Properties  
and Interactions'--Thomas L H--10/923  
->W H Brock, 'The Atomic Debates, Brodie and the Rejection  
of Atomic Theory'--Whyte L L--2/171  
176:R Jancel and T Kahan, 'Electrodynamics of Plasmas'--  
Frisman E A--7/646  
->A G Stenok, 'Electromagnetic Fluctuations in Plasma'--  
Hirshfield J L--7/644  
->S C Brown, 'Introduction to Electrical Discharges in  
Gases'--Holt E H--9/854  
->N G van Kampen and B U Felderhof, 'Theoretical Methods  
in Plasma Physics'--Kaufman A N--12/1175  
180:G H A Cole, 'An Introduction to the Statistical Theory  
of Classical Simple Dense Fluids'--Dunn T--7/645  
->C A Knight, 'The Freezing of Supercooled Liquids'--  
Fletcher N H--5/466  
->G V Marr, 'Photoionization Process in Gases'--Loeb L B--  
4/373  
185:A H Cottrell, 'Mechanical Properties of Matter'--Artman  
R A--1/68  
->D R Frankl, 'Electrical Properties of Semiconductor  
Surfaces'--Bennett A J--6/568  
->D Hull, 'Introduction to Dislocations'--Brody S B--2/174  
->J R Manning, 'Diffusion Kinetics for Atoms in  
Crystals'--Bruner L J--10/922  
->A V Sokolov, 'Optical Properties of Metals'--Phillips J  
C--3/281  
->C P Poole, 'Electron Spin Resonance'--Rogers R N--8/765  
->Materials, A 'Scientific American' Book--Sproull R L--  
8/767  
->R W H Stevenson, 'Phonons in Perfect Lattices and in  
Lattices with Point Imperfections'--Taylor D W--5/467  
190:S J Inglis, 'Planets, Stars and Galaxies'--Chupp E L--  
1/68  
->J Kovalevsky, 'Introduction to Celestial Mechanics'--  
Clemence G M--11/1024  
->T Page and L W Page, Eds, 'The Evolution of Stars, How  
They Form, Age and Die'--Fredrick I W--9/857  
->V. Szebehely, 'Theory of Orbits: The Restricted Problem  
of Three Bodies'--Jeffreys J H--4/375  
210:L Schwartz, 'Mathematics for the Physical Sciences'--  
Harrison B K--1/71  
->K Karamcheti, 'Vector Analysis and Cartesian Tensors  
with Selected Applications'--Kaplan J I--6/567  
->Y Choquet-Bruhat, 'Problems and Solutions in  
Mathematical Physics'--Lindquist R W--12/1174  
->M L Boas, 'Mathematical Methods in the Physical  
Sciences'--Mullin A A--7/644  
->A N Tychonov and A A Samarski, 'Partial Differential  
Equations of Mathematical Physics'--Seeger R J--10/922  
220:E L Steele, 'Optical Lasers in Electronics'--Wang C C--  
11/1025  
240:H G Hecht, 'Magnetic Resonance Spectroscopy'--Van  
Heuvelen A--5/466  
250:R W Fairbridge, 'The Encyclopedia of Atmospheric  
Sciences and Astrogeology'--Warwick J W--6/566  
280:H Grayson-Smith, 'The Changing Concepts of Science'--  
Hilt R L--1/69  
->S Bochner, 'The Role of Mathematics in the Rise of  
Science'--Hoffman B--6/564  
->A M Taylor, 'Imagination and the Growth of Science'--  
King A--6/563  
->C W Kilmister, 'Men of Physics: Sir Arthur Eddington'--  
Seeger R J--1/71  
->O Hahn, 'A Scientific Autobiography'--Seeger R J--2/170  
->R J Strutt, 'Life of John William Strutt, Third Baron  
Rayleigh, C M, F R S'--Strong J--12/1173  
290:I G Barbour, 'Issues in Science and Religion'--Bailey J  
M--6/562  
->S A Basri, 'A Deductive Theory of Space and Time'--Komar  
A--2/174  
330:E V Angerer and H Ebert, 'Physical Laboratory  
Handbook'--Armstrong H L--1/66  
510:L S Rodberg and R M Thaler, 'Introduction to the Quantum  
Theory of Scattering'--Fano U--4/373  
600:A M Weinberg, 'Reflections on Big Science'--Branscomb L  
M--1/65

## 420 - COURSE DESIGN

- REGULAR ARTICLES, NOTES AND LETTERS - - - - -  
145:Laboratory Exercises in Classical Electromagnetic Field  
Theory--Atwater H A--8/672  
340:An Experiment-Oriented General Physics Course--Snyder D  
D--11/1005  
350:A Sophomore Course in Experimental Physics--Carver G P,  
Scarl D B--4/361  
540:A New Approach to Teaching of Elementary Physics--  
Bertman B, Chase J, Creeger E S, Fox J N, Krogh C--  
12/1134  
->Students Do Not Think Physics Is 'Relevant.' What Can We  
Do About It?--Crane H R--12/1137  
->A Laboratory Course for Nonscience Majors--Fryshman B--  
3/262  
->Physical Oceanography for the Nonscience Major--Marsh K  
L--7/617  
ABSTRACTS ONLY - - - - -  
160:Reorganization of the Elementary Course in Nuclear  
Physics--Cohen B L--12/1186  
220:Basic Electronics for the Scientist: A New Course  
Approach--Kootsey J M, Neilsen I R--12/1188  
230:A Report on Proposals by Engineering Mechanics Teachers  
for Changes in Introductory Physics for Engineers--Alley  
R E--12/1179  
310:Removing the 'Cook Book' from Freshman Physics  
Laboratories--Prescott J R, Anger C D--12/1187

- >A New Approach to Laboratory Instruction--Shuchatowitz J, Landovitz L--12/1187
- 350:The Role of the Laboratory in Education--Zelby L W--12/1187
- 510:Teaching Introductory Physics in a 2-Yr Helical Pattern--DeGraaf D E, Boys D W--12/1184

## 430 - RESOURCE LETTERS

- REGULAR ARTICLES, NOTES and LETTERS - - - - -
- 115:Resource Letter GR-1 on General Relativity--Brill D R, Perisho R C--2/85
- 185:Resource Letter CEP-1 on the Ordinary Electronic Properties of Metals--Langenberg D N--9/777
- 190:Resource Letter OE-1 on Origin of the Elements--Fowler W A, Stephens W E--4/289
- 210:Resource Letter SP-1 on Symmetry in Physics--Park D--7/577
- 230:Resource Letter REA-1 on Reactors--Michael P, Schermer R I--8/659
- 455:Resource Letter BSPF-1, A Bibliography of Selected Physics Films--Riley W R--6/475

## 450 - AUDIO AND VISUAL AIDS

- REGULAR ARTICLES, NOTES and LETTERS - - - - -
- 155:A Quantum Mechanical Ripple Tank--Daniels M E, Schwartz J L--12/1088
- >One-Dimensional Scattering in Configuration Space and Momentum Space--Goldberg A, Schey H M, Schwartz J L--5/454/N
- 430:Resource Letter BSPF-1, A Bibliography of Selected Physics Films--Riley W R--6/475
- ABSTRACTS ONLY - - - - -
- 580:The Multimedia Course in Physics at the U S Naval Academy--Nixon J D, Kropf J F, Nordling D A, Hall E D--12/1181

## 455 - FILMS

- 720:CCP Film Publications--7/649
- REGULAR ARTICLES, NOTES and LETTERS - - - - -
- 000:Films (16 mm) for Students of Physics--Weber R L--4/302
- 145:Notes on 'Image Methods in Electrostatics' (A Computer-Animated Film)--Blum R--5/412
- 155:One-Dimensional Scattering in Configuration Space and Momentum Space--Goldberg A, Schey H M, Schwartz J L--5/454/N
- 430:Resource Letter BSPF-1, A Bibliography of Selected Physics Films--Riley W R--6/475
- ABSTRACTS ONLY - - - - -
- 000:The Film Program of Harvard Project Physics (with film demonstration)--Bork A M--12/1179
- 110:Newton's Equal Areas - An Animated Film--Bork A M--12/1190
- 145:Image Methods in Electrostatics - A Computer Animated Film--Blum R--12/1190
- FILM REVIEWS - - - - -
- 000:Bell Telephone Laboratories, 'Principles of the Optical Maser'--Breed H E--8/773
- >A Bork, B Cornwell and K Cornwell, 'Newton's Equal Areas'--Leitner A--8/774
- >R Hertz and C Brewer, 'The Mass of Atoms'--Llewellyn R A--8/772
- 125:Films on Acoustics and Wave Motion--Stumpf F B--11/1026
- 140:A Leitner, 'An Introduction to Superconductivity'--Mate C F--7/647
- 155:P Morrison, 'The Fabric of the Atom - an Introduction to Quantum Mechanics'--Ross J S--9/860

## 460 - INSTRUCTIONAL COMPUTER USE

- REGULAR ARTICLES, NOTES and LETTERS - - - - -
- 110:Energy Transfer in One-Dimensional Collisions of Many Objects--Hart J B, Herrmann R B--1/46
- 115:Automated Tutoring and Its Discontents--Taylor E F--6/496
- 155:A Quantum Mechanical Ripple Tank--Daniels M E, Schwartz J L--12/1088
- 310:Instructional Uses of the Computer: Simple Pendulum Experiment--Haddad D J--3/273/N
- 510:Instructional Uses of the Computer: 1130 FORTRAN Mechanics Programs--Bork A M--10/907/N
- ABSTRACTS ONLY - - - - -
- 110:Using Digital Computers in Introductory Physics--Shirer D L, Adolphson J W--1/82
- 115:Relativistic "Pictures" by Computers--Shirer D L, Bartel T W--1/82
- 210:Using the Sine-Curve Computer in the Physics Classroom--Saunders W W--12/1181
- 360:Experimental Computer-Oriented Introductory Laboratory--Smith P A--12/1180
- 540:A Computer-Assisted Instruction Course in Introductory Physics--Kromhout C, Edwards S, Schwarz G--12/1180

- >Development of Modern Physics Course for Computer-Assisted Instruction at the U S Naval Academy--Kropf J F, Nordling D A, Nixon J D, Hall E D--12/1180
- >Remedial Branching in Programed Instruction--Logan T H--12/1180
- >Computers in Teaching Elementary Statistical Physics--McCaffrey J W--12/1181
- >Elementary Physics through Computer-Assisted Instruction--Schwarz G, Hansen D--1/82
- >An Experiment in Physics Tutorial by Computer--Vierling A F, Kropf J F, Nixon J D--12/1181

## 470 - TESTING--THEORY AND TECHNIQUES

- ABSTRACTS ONLY - - - - -
- 000:The Analysis of Test Items in General Physics--Pinkston E R--12/1181

## 500 - SCIENCE EDUCATION

- 720:CCP Panel on Physics Education in Two-Year Colleges--7/649
- REGULAR ARTICLES, NOTES and LETTERS - - - - -
- 145:Batteries Connected in Parallel--Wallingford J S, Jones H W--7/639/N
- 600:My Reflections on the Teaching of Physics--White H E--5/382
- ABSTRACTS ONLY - - - - -
- 000:The Physics Education Programs of the United Nations Educational, Scientific, and Cultural Organization--Baez A V--1/76
- >Factors Related to Baccalaureate-to-Doctorate Time Lapse in Physics--Boecker F D--12/1185
- >Physics in Community Colleges--Burnam T D--1/79
- >Weekly Physics Colloquia--Fineman M A--1/78
- >Correlation of Various Predictors with Student Performance in Sophomore Physics--Haidler W B, Grady M J--1/80
- 600:'11 Physics Become Obsolete?--Strassenburg A A--1/82

## 510 - CURRICULUM

- REGULAR ARTICLES, NOTES and LETTERS - - - - -
- 110:Instructional Uses of the Computer: 1130 FORTRAN Mechanics Programs--Bork A M--10/907/N
- 151:The Description of Polarization in Classical Physics--Collett E--8/713
- 155:Spin Hamiltonian Derivation of Paramagnetic Susceptibility in Axial Crystal Systems--Veigle M J, Henry E M--9/800
- 180:Teaching of Physics of Fluids in U S Colleges and Universities--Emrich R J, Snyder H A, Uhlenbeck G E--10/886
- 420:An Experiment-Oriented General Physics Course--Snyder D D--11/105
- 540:'11 Physics Become Obsolete?--Strassenburg A A--6/520
- ABSTRACTS ONLY - - - - -
- 000:A Summer Program Consisting of Undergraduate Research Projects--PHELPS F T--12/1185
- >A Plea for Excellence in Our 4-Yr Liberal Arts Colleges--Schele C E--12/1185
- >Factors Contributing to the Enrollment of Physics Majors at Washington State University--Schultz F H C--12/1185
- >PSNS: Physical Science for Nonscience Students--Wood E A--1/81
- 210:Need of Geometry for Physics Teaching--Merdsoy U S--1/77
- 420:Teaching Introductory Physics in a 2-Yr Helical Pattern--DeGraaf D E, Boys D W--12/1184
- 540:A Frame of Reference for Teaching Physical Science--Hauptman I--1/77
- BOOK REVIEWS - - - - -
- 155:L S Rodberg and R M Thaler, 'Introduction to the Quantum Theory of Scattering'--Fano U--4/373
- 190:S J Inglis, 'Planets, Stars and Galaxies'--Chupp E L--1/68

## 520 - ELEMENTARY AND SECONDARY SCHOOL SCIENCE

- ABSTRACTS ONLY - - - - -
- 000:A Joint High School and University Project--Garrett R E, Teller M H, Strickland A W--12/1184
- >Developing a Science Oriented High School Photography Program--Grimes J A--1/82
- >Pre- and Post-Sputnik Physics Background of College Freshmen--Kruglak H--12/1184
- >A Secondary-School-Level Honors Physics Course Directed to Both Science and Nonscience Majors--La Chance F--12/1184
- >Pupils' Reactions to Kits for Concepts in Science--Marsico J--1/82
- >Teaching Elementary Physics Principles at the Early Junior High School Level--Redfield D D, Darrow S P--12/1183

- >The Nuffield O-Level Physics Teaching Project--Rogers E M, Wenham E J--12/1179  
 ->A Report on the First Harvard Project Physics Institute Supported by the NSF Summer Institutes Program--Lepp T H--12/1184

## 530 - TEACHER TRAINING

- REGULAR ARTICLES, NOTES and LETTERS - - - - -  
 540:Will Physics Become Obsolete?--Strassenburg A A--6/520  
 ABSTRACTS ONLY - - - - -  
 000:Summer Study Programs for the Junior College Physics Teacher--Appleton G L--1/79  
 ->The Junior College Physics Teacher in Florida--Garrett R E--1/79  
 ->Problems of Physics Teaching in the Two-Year Colleges--Sandler B--1/79  
 ->Physics in the Two-Year Colleges of Texas--Shugart C G--1/80

## 540 - TEACHING METHODS AND STRATEGIES

- REGULAR ARTICLES, NOTES and LETTERS - - - - -  
 110:Classical Transformation Operators and the S Matrix--Campbell P M--11/931  
 ->A Derivation of the Jacobi Identity in Classical Mechanics--Epstein S T--5/759/N  
 135:The Derivatives of the Entropy at Absolute Zero--Bartels R A--11/1018/N  
 145:Is Charge Conservation Needed to Derive the Displacement Current?--Yano A F--7/599  
 210:On the Validity of Converting Sums to Integrals in Quantum Statistical Mechanics--Stutz C--9/826  
 420:A New Approach to Teaching of Elementary Physics--Bertman B, Chase J, Creeger E S, Fox J N, Krogh C--12/1134  
 ->Students Do Not Think Physics Is 'Relevant.' What Can We Do About It?--Crane H R--12/1137  
 ->A Laboratory Course for Nonscience Majors--Fryshman B--3/262  
 ->Physical Oceanography for the Nonscience Major--Harsh K L--7/617  
 460:Automated Tutoring and Its Discontents--Taylor E F--6/496  
 510:Will Physics Become Obsolete?--Strassenburg A A--6/520  
 710:Artistic Invitations to the Study of Physics--Holden A--12/1082  
 ABSTRACTS ONLY - - - - -  
 000:The Effect of a Rule-of-Thumb on the Transfer Value of a Principle--Logan T H--1/79  
 120:The Pedagogy of Statistical Mechanics--Hobson A--12/1183  
 290:Sensory Perception in Physics--Williams D--1/77  
 450:The Multimedia Course in Physics at the U S Naval Academy--Nixon J D, Kropf J F, Nordling D A, Hall E D--12/1181  
 460:A Computer-Assisted Instruction Course in Introductory Physics--Kromhout O, Edwards S, Schwarz G--12/1180  
 ->Development of Modern Physics Course for Computer-Assisted Instruction at the U S Naval Academy--Kropf J F, Nordling DA, Nixon J D, Hall E D--12/1180  
 ->Remedial Branching in Programed Instruction--Logan T H--12/1180  
 ->Computers in Teaching Elementary Statistical Physics--McCaffrey J W--12/1181  
 ->Elementary Physics through Computer-Assisted Instruction--Schwarz G, Hansen D--1/82  
 ->An Experiment in Physics Tutorial by Computer--Vierling A F, Kropf J F, Nixon J D--12/1181  
 510:A Frame of Reference for Teaching Physical Science--Hauptman I--1/77

## 600 - SCIENCE AND SOCIETY

- REGULAR ARTICLES, NOTES and LETTERS - - - - -  
 163:The Richtmyer Memorial Lecture - Particles, Accelerators and Society--Wilson R R--6/490  
 500:My Reflections on the Teaching of Physics--White H E--

5/382

- ABSTRACTS ONLY - - - - -  
 000:On Scientific Thought in Literature--Seeger R J--1/76  
 500:Will Physics Become Obsolete?--Strassenburg A A--1/82  
 BOOK REVIEWS - - - - -  
 000:A M Weinberg, 'Reflections on Big Science'--Branscomb L M--1/65

## 700 - PHYSICS ORGANIZATIONAL ACTIVITIES

## 710 - AMERICAN ASSOCIATION OF PHYSICS TEACHERS

- 000:Harvey E White: Cersted Medalist for 1968 -- Phillips M--5/381  
 ->1968 Citations for Distinguished Service--5/388  
 ->American Association of Physics Teachers: Organization Table for 1968--7/65  
 ->AAPT Budget for 1968--6/572  
 ->AAPT Treasurer's Report for the Year Ended 31 December 1967--8/776  
 ->The Robert A Millikan Lecture Award 1968--12/1081  
 REGULAR ARTICLES, NOTES and LETTERS - - - - -  
 540:Artistic Invitations to the Study of Physics--Holden A--12/1082  
 MEETINGS - - - - -  
 000:Proceedings of the American Association of Physics Teachers, Thirty Seventh Annual Meeting, The Palmer House, Chicago, 29 January - 1 February 1968--12/1178  
 ->Central Pennsylvania Section--1/73  
 ->Proceedings of the American Association of Physics Teachers, Summer Meeting at St. Lawrence University, 15-17 June 1967--1/75  
 ->Washington Section--2/179  
 ->Colorado-Wyoming Section--2/179  
 ->Kentucky Section--2/178  
 ->Iowa Section--3/285  
 ->Western Pennsylvania Section--4/378  
 ->Northern California Section--4/378  
 ->Minnesota Section--5/473  
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